

Tenth Young Researchers' Conference
Materials Science and Engineering

December 21-23, 2011, Belgrade, Serbia
Serbian Academy of Sciences and Arts, Knez Mihailova 35 & 36

Program and the Book of Abstracts

Materials Research Society of Serbia
Institute of Technical Sciences of SASA

December 2011, Belgrade, Serbia

Book title:

Tenth Young Researchers' Conference - Materials Science and Engineering:
Program and the Book of Abstracts

Publisher:

Institute of Technical Sciences of SASA
Knez Mihailova 35/IV, 11000 Belgrade, Serbia
Tel: +381-11-2636994, fax: 2185263
<http://www.itn.sanu.ac.rs>

Editor:

Prof. Dr. Nenad Ignjatović

Technical Editor:

Aleksandra Stojičić

Printer:

Copy Planet
Brankova 12, 11000 Belgrade, Serbia
Tel: +381-11-3036545, fax: 3036546
<http://www.copyplanet.rs>

Edition:

130 copies

CIP - Каталогизacija у публикацији
Народна библиотека Србије, Београд

66.017/.018(048)

YOUNG Researchers' Conference Materials Science and Engineering (10 ; 2011 ; Beograd)

Program ; and the Book of Abstracts / Tenth Young Researchers' Conference Materials Science and Engineering, December 21-23, 2011, Belgrade, Serbia ; [organized by] Materials Research Society of Serbia and Institute of Technical Sciences of the Serbian Academy of Sciences and Arts ; [editor Nenad Ignjatović]. - Belgrade : Institute of Technical Sciences of SASA, 2011 (Belgrade : Copy Planet). - XV, 62 str. ; 30 cm
Tiraž 130. - Registar.

ISBN 978-86-80321-27-1

1. Materials Research Society of Serbia (Beograd) 2. Institute of Technical Sciences of SASA (Beograd)

a) Наука о материјалима - Апстрактни b) Технички материјали - Апстрактни
COBISS.SR-ID 188165900



VI/1

Determination of glucose using polyaniline modified electrode

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Sensor electrode was formed by immobilization of glucose oxidase (GOx) on polyaniline (PANI), electrochemically synthesized on graphite electrode from aqueous hydrochloride acid electrolyte containing aniline monomer by galvanostatic method. Optimization of the current density used for the synthesis of PANI was performed. Immobilization of GOx was achieved by crosslinking via glutaraldehyde and the efficiency of the immobilization was determined spectrophotometrically. Using chronoamperometric curves of glucose oxidation on polyaniline apparent Michaelis constant was estimated to be 0.273 mM. The storage stability of the enzyme electrode was examined for twenty days, after which it retained 84% of its initial signal.

VI/2

Oxygen reduction on polycrystalline Au modified by nanosized Pd islands

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Oxygen reduction reaction was studied on polycrystalline gold, Au(poly), modified by nanosized palladium islands. Linear sweep voltammetry measurements were performed using rotating Au-disk electrode in oxygen saturated 0.05 M H₂SO₄ solution. Morphology of obtained Pd/Au(poly) electrodes was characterized by tapping-mode atomic force microscopy, after each deposition from Pd containing solution. Only homogeneous distribution of deposited Pd islands nonuniform in size is observed. Active surface area of the deposited Pd was estimated from cyclic voltammetry profiles. Obtained Pd/Au(poly) surfaces have shown a significant catalytic activity towards oxygen reduction reaction which increases with the increase of the active surface area.